

POWER COST STUDY;

WYOMING 9 UINTA //

2 U.S. UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL ELECTRIFICATION ADMINISTRATION,
WASHINGTON 25, D. C.
2a POWER DIVISION //

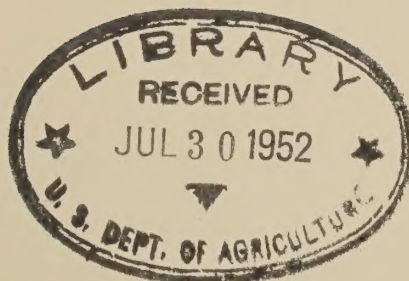
May 9, 1951

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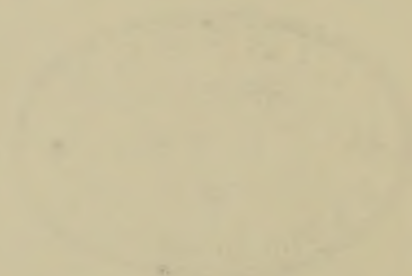
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SYSTEM POWER ANALYSISWYOMING 9 UINTA

On June 29, 1950, the Bridger Valley Electric Association, Inc. (Wyoming 9 Uinta) was granted a loan of \$311,000 to install two approximately 500 kw dual-fuel diesel generating units in the cooperative's generating plant at Lyman. Now that bids have been received for this work it is apparent that the original loan of \$311,000 will have to be supplemented if this construction as originally planned is to be finished.

In order that the cooperative may have sufficient funds to install the two approximately 500 kw dual-fuel diesel generating units, it will be necessary that a supplemental loan of \$84,000 be made. This loan is required because of the general rise in construction costs that has been taking place since last summer.

When the allocated load of 4,312,714 is being delivered to the members from the distribution substation, it is estimated that the cost of power will be 1.40 cents per kwh. By 1961 when the load has grown to an estimated 5,150,000 kwh, the cost of power will approximate 1.36 cents per kwh.



J. K. Taylor, Head
Power Planning Staff
Power Division

REPORT
ON THE
PROGRESS OF THE
WORK DURING THE
YEAR 1900

The first part of the report deals with the general progress of the work during the year. It is divided into two main sections: the first section deals with the work done in the various departments, and the second section deals with the work done in the various branches of the service. The first section is divided into three parts: the first part deals with the work done in the various departments, the second part deals with the work done in the various branches of the service, and the third part deals with the work done in the various branches of the service. The second section is divided into two parts: the first part deals with the work done in the various branches of the service, and the second part deals with the work done in the various branches of the service.

The second part of the report deals with the work done in the various branches of the service. It is divided into two main sections: the first section deals with the work done in the various branches of the service, and the second section deals with the work done in the various branches of the service. The first section is divided into three parts: the first part deals with the work done in the various branches of the service, the second part deals with the work done in the various branches of the service, and the third part deals with the work done in the various branches of the service. The second section is divided into two parts: the first part deals with the work done in the various branches of the service, and the second part deals with the work done in the various branches of the service.

The third part of the report deals with the work done in the various branches of the service. It is divided into two main sections: the first section deals with the work done in the various branches of the service, and the second section deals with the work done in the various branches of the service. The first section is divided into three parts: the first part deals with the work done in the various branches of the service, the second part deals with the work done in the various branches of the service, and the third part deals with the work done in the various branches of the service. The second section is divided into two parts: the first part deals with the work done in the various branches of the service, and the second part deals with the work done in the various branches of the service.

The fourth part of the report deals with the work done in the various branches of the service. It is divided into two main sections: the first section deals with the work done in the various branches of the service, and the second section deals with the work done in the various branches of the service. The first section is divided into three parts: the first part deals with the work done in the various branches of the service, the second part deals with the work done in the various branches of the service, and the third part deals with the work done in the various branches of the service. The second section is divided into two parts: the first part deals with the work done in the various branches of the service, and the second part deals with the work done in the various branches of the service.

POWER COST STUDY

WYOMING 9 UINTA

INTRODUCTION

On June 29, 1950, the Bridger Valley Electric Association, Inc. (Wyoming 9 Uinta) was granted a loan in the amount of \$660,000. Of this amount \$311,000 was to be used to install two approximately 500 kw dual-fuel diesel generating units in the cooperative's generating plant at Lyman. Now that bids have been received for this work it is apparent that the original loan of \$311,000 will have to be supplemented if this construction as originally planned is to be finished.

CONCLUSIONS

In order that the cooperative may have sufficient funds to install the two approximately 500 kw dual-fuel diesel generating units in its generating plant at Lyman, Wyoming, it will be necessary that a supplemental loan of \$84,000 be made to the cooperative. When this \$84,000 is added to the \$311,000 previously loaned for this purpose, the cooperative will have invested \$395,000 in these additional diesel generating facilities. When the allocated load of 4,312,714 kwh is being delivered to the members from the distribution substation, it is estimated that the cost of this power will be 1.40 cents per kwh. By 1961 when the load has grown to an estimated 5,150,000 kwh, the cost of power will be approximately 1.36 cents per kwh.

PRESENT SYSTEM

The cooperative's present power plant at Lyman, Wyoming has two relatively new 200 kw non-supercharged dual-fuel diesel generating units and four old 56 kw spark-ignited gas engines, giving a present firm capacity of 425 kw with a total installed plant capacity of 625 kw. Demand on this plant has already exceeded the firm plant capacity making it evident that it will be necessary for this cooperative to install additional capacity.

A review of the Power Cost Study on which the \$311,000 loan for additional generating capacity is based shows that the following construction was contemplated. It was proposed that two new approximately 500 kw dual-fuel diesel generating units, and a new switchboard be installed at the Lyman plant and that the four old gas engines along with the old switchboard be retired. When these additions are completed the Lyman plant would have an installed capacity of 1400 kw. This installed capacity will be adequate to take care of the allocated loads. It is estimated that the salvage value of the small engines would equal the cost of removal due to the remote location of the plant. Therefore, no value is assigned to the sale of these units.

Sometime after 1955 it is recommended that the two existing 200 kw engines be supercharged. It is believed that the rating of the generating units

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The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's development.

The second part of the report deals with the economic situation of the country. It is a very interesting and informative study of the country's economic development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's economic development.

The third part of the report deals with the social situation of the country. It is a very interesting and informative study of the country's social development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's social development.

The fourth part of the report deals with the political situation of the country. It is a very interesting and informative study of the country's political development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's political development.

The fifth part of the report deals with the future of the country. It is a very interesting and informative study of the country's future. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's future.

could be increased to about 300 kw each at a total cost of \$40,000. By making this conversion 200 kw of additional capacity could be obtained giving the cooperative enough capacity to take care of the ultimate load.

Funds in the amount of \$311,000 were estimated to be required to install this approximately 1000 kw of dual-fuel diesel generating capacity in the cooperative's plant.

The cooperative has taken bids for this construction which indicates that because of the sharp increase in construction costs in the past nine months, a deficiency loan will be required. The actual contracts have been closely studied and it has been determined that \$84,000 will be required to complete this previously authorized construction. Full details of this increased construction budget will be found in Appendix II of this report.

OTHER CONSIDERATIONS

Before the previous loan was made a detailed analysis comparing the cost of generated power to the cost of purchased power from the Utah Power and Light Company was made. The conclusions reached by that report was that there was no substantial economic benefit of either plan over the other. Since the cooperative preferred the entire self-generation plan the \$311,000 loan for the additional generating capacity was made. The rise in construction costs would also affect the cost of transmission facilities necessary to interconnect with the Utah Power and Light Company and there would still be no substantial difference in the cost of purchased or generated energy. For this reason it is recommended that the cooperative go ahead with the construction of its generating plant.

COST OF POWER & LOAD DATA

The load data used in this study was sent to the Power Division from the A & L Division on May 7, 1951. A brief summary of the pertinent load and power cost data appears below:

	<u>1953</u>	<u>1956</u>	<u>1961</u>	<u>Allocated</u>
KWH @ SS	3,683,000	4,320,000	5,150,000	4,312,714
Cost of Power (¢/kwh)	1.74	1.57	1.36	1.40

... about 200 to 300 ...
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APPENDIX I

WYOMING 9 UINTA

LOAD DATA

	<u>1953</u>	<u>1956</u>	<u>1961</u>	<u>Allocated</u>
<u>Farm</u>				
Members	342	350	367	342
Annual Consumption	3,400	4,000	4,700	4,200
Total Consumption	1,165,000	1,400,000	1,730,000	1,436,400
<u>Non-Farm</u>				
Members	284	300	320	284
Annual Consumption	2,200	2,600	3,200	2,820
Total Consumption	625,000	780,000	1,024,000	800,880
<u>Small Commercial</u>				
Members	135	140	145	135
Annual Consumption	9,000	9,600	10,000	9,600
Total Consumption	1,215,000	1,342,000	1,450,000	1,296,000
<u>Street Lighting</u>				
Members	3	3	3	3
Annual Consumption	17,000	18,000	19,000	16,800
Total Consumption	51,000	54,000	57,000	50,400
<u>School & Churches</u>				
Members	10	13	15	10
Annual Consumption	3,800	3,900	4,000	3,900
Total Consumption	38,000	50,700	60,000	39,000
<u>Totals</u>				
Members	774	806	850	774
Annual KWH	3,094,000	3,626,700	4,321,000	3,622,680
System KWH Includes (16% Dist. Losses)	3,683,000	4,320,000	5,150,000	4,312,714
<u>Summary - Load Data</u>				
Number of Members	774	806	850	774
KWH @ SS	3,683,000	4,320,000	5,150,000	4,312,714
Load Factor	45	47.5	50	50
Peak Demand	935	1,035	1,175	985

1. INTRODUCTION

2. BACKGROUND

3. OBJECTIVES

The purpose of this study is to investigate the effects of various factors on the performance of the system. The objectives of the study are to determine the relationship between the input variables and the output variables, to identify the factors that influence the performance of the system, and to develop a model that can predict the performance of the system.

The study is organized as follows. Chapter 1 introduces the study and its objectives. Chapter 2 provides a background on the system and the factors that influence its performance. Chapter 3 describes the methodology used in the study, including the data collection and analysis techniques. Chapter 4 presents the results of the study, including the statistical analysis and the model development. Chapter 5 discusses the conclusions of the study and the implications for future research.

The study is based on a sample of 100 observations. The data were collected from a series of experiments conducted over a period of six months. The results of the study are presented in Chapter 4, where it is shown that there is a significant relationship between the input variables and the output variables. The model developed in Chapter 5 is able to predict the performance of the system with a high degree of accuracy.

APPENDIX II

RECAPITULATION OF INVESTMENT

Investment prior to 6/30/50 Lyman Plant	\$195,000.00
Acquisition of 2 - 50 kw diesel units (1)	1,800.16
Loan of 6/30/50	311,000.00
This Request	<u>84,000.00</u>
Total (Allocated & 1953 Condition)	\$591,800.16
Future Investment	<u>\$ 40,000.00</u>
Total (1956 & 1960 Conditions)	\$631,800.16

- (1) Wyoming 9 Uinta acquired 2 - 50 kw diesel units from Wyoming 21 Carbon for \$11,945.16 and sold them to Wyoming 25 Crook for \$10,145.00.

	<u>1953</u>	<u>1956</u>	<u>1960</u>	<u>Allocated</u>
System Peak Demand - KW	935	1,035	1,175	985
Present Plant Capacity - KW	625	625	625	625
This Request - KW (2)	851	851	851	851
Future - KW	-	200	200	-
Total Installed Capacity - KW	1,476	1,676	1,676	1,476
Gross Firm Capacity - KW	938	1,138	1,138	938

- (2) Addition of 1,076 kw and removal of 225 kw in existing generating capacity. The low bid was for the installation of 2 - 538 kw units at the plant site.

Note:

Although there is a slight deficit of system firm capacity in comparison to the estimated system demand this situation is not considered critical because the overload capability of the units together with diversity between load areas will be able to make up this deficit.

RECORDS

OFFICE OF THE ATTORNEY GENERAL

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APPENDIX II (Cont)

WYOMING 9 UINTA

REVISED CONSTRUCTION BUDGET

Addition of two 500 kw (approximately) dual-fuel diesel generating units to the Lyman Plant.

<u>Item</u>	<u>Original Budget</u>	<u>Change</u>	<u>Revised Budget</u>
1. Generating units complete with auxiliaries, installed	\$ 149,000	/ \$51,000	\$200,000
2. Building, Engine Foundation and related structures	60,000	-	60,000
3. Electrical Work	33,000	/ 30,000	63,000
4. Miscellaneous Construction	22,000	(12,000)	10,000
5. Engineering	14,000	-	14,000
6. Legal	600	-	600
7. Contingencies	<u>6,400</u>	-	<u>6,400</u>
Total	\$285,000	/ \$69,000	\$354,000

Substation

1. Labor and Materials	\$ 18,000	/ \$16,000	\$ 34,000
2. Engineering	1,000	-	1,000
3. Contingency	<u>2,000</u>	<u>(1,000)</u>	<u>1,000</u>
Total	\$ 21,000	\$15,000	\$ 36,000
Tools and Spare Parts	<u>\$ 5,000</u>	-	<u>\$ 5,000</u>
Grand Total	\$311,000	/ \$84,000	\$395,000

APPENDIX A

TABLE A

Summary of Data

The following table shows the results of the experiments conducted during the period from January 1, 1944, to December 31, 1944.

The data were obtained from the following sources:

1. Experiments

2. Observations

3. Calculations

4. Measurements

5. Records

6. Notes

7. Reports

8. Letters

9. Diagrams

10. Photographs

11. Maps

12. Charts

13. Tables

14. Forms

15. Books

16. Periodicals

17. Patents

18. Standards

19. References

20. Other

APPENDIX III

	<u>1953</u>	<u>1956</u>	<u>1961</u>	<u>Allocated</u>
KWH @ SS	3,683,000	4,320,000	5,150,000	4,312,714
KWH Gross (5% Station Use)	3,875,000	4,550,000	5,440,000	4,540,000

Annual Expenses

Fuel @ 2.98 mills/ gross kwh (1)	\$11,550	\$13,600	\$16,200	\$13,500
Lube (60¢/gal) (1300 kwh/gal)	1,790	2,100	2,520	2,085
Maintenance Materials & Supplies	3,500	3,500	3,500	3,500
Payroll	15,000	15,000	15,000	15,000
Interest & Amortization	-	-	-	24,260
Interest & Depreciation	29,870	31,575	30,290	-
Insurance	2,000	2,000	2,000	2,000
Miscellaneous	290	225	490	155
	<u>\$64,000</u>	<u>\$68,000</u>	<u>\$70,000</u>	<u>\$60,500</u>
KWH @ SS	3,683,000	4,320,000	5,150,000	4,312,714
Cost per KWH (¢/kwh)	1.74	1.57	1.36	1.40

(1) Oil 14.5¢/gal (143,000 BTU/gal) (800 BTU/KWH gross)
Gas 18.5¢/10⁶ BTU (11,700 BTU/kwh gross)

RECEIPTS

1900	1.00	1.00	1.00	1.00
1901	2.00	2.00	2.00	2.00
1902	3.00	3.00	3.00	3.00
1903	4.00	4.00	4.00	4.00
1904	5.00	5.00	5.00	5.00
1905	6.00	6.00	6.00	6.00
1906	7.00	7.00	7.00	7.00
1907	8.00	8.00	8.00	8.00
1908	9.00	9.00	9.00	9.00
1909	10.00	10.00	10.00	10.00
1910	11.00	11.00	11.00	11.00
1911	12.00	12.00	12.00	12.00
1912	13.00	13.00	13.00	13.00
1913	14.00	14.00	14.00	14.00
1914	15.00	15.00	15.00	15.00
1915	16.00	16.00	16.00	16.00
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1918	19.00	19.00	19.00	19.00
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1993	94.00	94.00	94.00	94.00
1994	95.00	95.00	95.00	95.00
1995	96.00	96.00	96.00	96.00
1996	97.00	97.00	97.00	97.00
1997	98.00	98.00	98.00	98.00
1998	99.00	99.00	99.00	99.00
1999	100.00	100.00	100.00	100.00

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